

Claims

We claim:

- 1) A method for introducing nucleic acid molecules into human beings and into non-human organisms comprising:
 - c) Isolating and purifying RNA molecules;
 - d) Incubating the RNA molecules with sperm cells;
 - e) Fertilizing eggs with the sperm cells;
 - f) Implanting the eggs or embryos derived from eggs into the appropriate host species and generating offspring; and
 - g) Identifying offspring expressing the desired traits of the introduced genes.
- 2) The method of claim 1, in which the RNA is derived from a retrovirus, a retro-transposon, or a retro-vector.
- 3) The method of claim 1, in which the RNA is derived from a cell or cells expressing the RNA as cellular, viral, or vector RNA.
- 4) The method of claim 1, in which a cell extract containing RNA or intracisternal virus-like particles is used in place of purified RNA molecules.
- 5) The method of claim 1, in which a cellular RNA is used.
- 6) The method of claim 1, in which the RNA contains a viral or retro-viral packaging signal.
- 7) The method of claim 1, in which the RNA contains viral integration sequences.
- 8) The method of claim 1, in which the RNA contains retroviral or retrotransposon long terminal repeats (LTRs).
- 9) The method of claim 1, in which the RNA molecule(s) are derived from in vitro-transcribed RNA, such as T7 or SP6 polymerase-derived RNA.
- 10) The method of claim 1, in which the resulting transgenic organisms are used for agricultural or biotechnological purposes.
- 11) The method of claim 1, in which the resulting organisms are used to produce proteins, polypeptides, antibodies, cytokines, hormones or antigens.
- 12) The method of claim 1, in which the resulting transgenic organisms are used to make nucleic acid molecules, RNA, DNA, anti-sense nucleic acid molecules, vectors (as RNA, DNA or virus particles) or triple helix nucleic acid molecules.
- 13) The method of claim 1, in which the resulting transgenic organisms are used to make proteins secreted as milk proteins or as egg proteins.
- 14) The method of claim 1, wherein artificial insemination is used in place of in vitro fertilization.
- 15) The method of claim 1, used to treat or to prevent a disease or to impart a different genotype or phenotype in a human being.
- 16) The method of claim 1, used to treat a disease or to impart a different phenotype in a human being, wherein the genes are transmitted episomally so as not to alter the germ line.
- 17) The method of claim 1, wherein the transmitted foreign genes further comprise a suicide gene, so as to permit removal of the transgene from the affected cells at a later time.

- 18) The composition of matter comprising at least one retrovirus-derived or retrovirus transposon-derived ribonucleic acid preparation, comprising at least: a) retroviral or retrovirus transposon long terminal repeats; b) reverse transcriptase primer binding sites; c) a retrovirus packaging signal; and d) at least one foreign gene, whereby the ribonucleic acid preparation enables reverse transcription and perpetuation of the RNA as DNA in a transgenic organism.
- 19) A method of gene transfer comprising:
- a) generating an organism bearing foreign genes by the method of claims 1;
 - b) preparing a cell extract, virus preparation or RNA preparation from cells, organs, embryos or tissues of the organism;
 - c) incubating the extract with cells, tissues, or organs of another origin;
 - d) selecting for the expression of the transferred foreign gene(s) in the recipient cells.

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